

WHAT IS CLAIMED IS:

- 1 1. A process for the oxidation of an olefin
2 comprising three or more carbon atoms, wherein the
3 process comprises:
4 reacting the olefin with oxygen to form a
5 reaction mixture in the presence of a catalyst
6 composition comprising:
7 silver; and,
8 a promoter comprising potassium and a promoter
9 comprising rhenium
10 deposited on an α -alumina carrier, wherein the
11 potassium promoter provides potassium at a
12 concentration of up to 120 μ mole per gram of
13 catalyst composition.
- 1 2. The process of claim 1, wherein the potassium
2 promoter provides potassium at a concentration of
3 from 12 μ mole to 100 μ mole per gram of catalyst
4 composition and the rhenium promoter provides
5 rhenium at a concentration of from 3 μ mole to 20
6 μ mole per gram of catalyst composition.
- 1 3. The process of claim 2, wherein the α -alumina
2 carrier has a BET surface area of 0.1 m²/g to 25
3 m²/g, and an apparent porosity of from 0.1 ml/g to
4 1.2 ml/g.

- 1 4. The process of claim 1, wherein the α -alumina
2 carrier comprises at least 60 %w α -alumina.
- 1 5. The process of claim 1, wherein the α -alumina
2 carrier has a pore size distribution such that the
3 pores with diameters in the range of from 0.2 μm
4 to 10 μm comprise more than 75 % of the total pore
5 volume; the pores with diameters greater than 10
6 μm comprise less than 20 % of the total pore
7 volume; and the pores with diameters less than 0.2
8 μm comprise less than 10 % of the total pore
9 volume.
- 1 6. The process of claim 1, wherein the α -alumina
2 carrier has a water absorption of at least 0.35
3 ml/g and a surface area in the range of from 1.0
4 m^2/g to 5 m^2/g .
- 1 7. The process of claim 1, wherein the α -alumina
2 carrier is based on:
3 (a) from 50 %w to 90 %w of a first particulate α -
4 alumina having an average particle size of from
5 more than 10 μm up to 100 μm ; and,
6 (b) from 10 %w to 50 %w of a second particulate α -
7 alumina having an average particle size of from 1
8 μm to 10 μm ; said %w being based on the total
9 weight of α -alumina in the mixture.

1 8. The process of claim 1, wherein the α -alumina carrier
2 comprises:

3 (a) from 65 %w to 75 %w, relative to the total
4 weight of α -alumina in the mixture, of a first
5 particulate α -alumina having an average particle size of
6 from 11 μ m to 60 μ m;

7 (b) from 25 %w to 35 %w, relative to the total
8 weight of α -alumina in the mixture, of a second
9 particulate α -alumina having an average particle size of
10 from 2 μ m to 6 μ m;

11 (c) from 2 %w to 5 %w of an alumina hydrate,
12 calculated as aluminum oxide relative to the total weight
13 of α -alumina in the mixture;

14 (d) from 0.2 %w to 0.8 %w of an amorphous silica
15 compound, calculated as silicium oxide relative to the
16 total weight of α -alumina in the mixture; and,

17 (e) from 0.05%w to 0.3 %w of an alkali metal
18 compound, calculated as the alkali metal oxide relative
19 to the total weight of α -alumina in the mixture.

1 9. The process of claim 1 wherein the reaction
2 mixture further comprises an organic chloride promoter.

1 10. The process of claim 9 wherein the organic
2 chloride is present at a concentration of at least 50 ppm
3 by volume.

1 11. The process of claim 9, wherein the reaction
2 mixture further comprises a NO_x promoter, wherein x is 1
3 or 2.

1 12. The process of claim 9, wherein the NO_x promoter
2 is present at a concentration of at least 10 ppm by
3 volume.

1 13. A catalyst composition for the oxidation of an
2 olefin comprising three or more carbon atoms,
3 wherein the catalyst composition comprises:
4 silver; and,
5 a promoter comprising potassium and a promoter
6 comprising rhenium
7 deposited on an α-alumina carrier, wherein the
8 potassium promoter provides potassium at a
9 concentration of from 8 μmole to 120 μmole per
10 gram of catalyst composition.

1 14. The catalyst of claim 13, wherein the rhenium
2 promoter provides rhenium at a concentration of from
3 1 μmole to 30 μmole per gram of catalyst
4 composition.

1 15. The catalyst of claim 13, wherein the carrier
2 comprises an α-alumina carrier is based on:

3 (a) from 50 %w to 90 %w of a first particulate α-
4 alumina having an average particle size of from more than
5 10 up to 100 μm; and,

6 (b) from about 10 %w to about 50 %w of a second
7 particulate α -alumina having an average particle size of
8 from 1 μm to 10 μm ; and wherein said %w is based on the
9 total weight of α -alumina in the mixture.

1 16. The catalyst of claim 13, wherein α -alumina
2 carrier has a pore size distribution such that pores with
3 diameters in the range of from 0.2 μm to 10 μm represent
4 more than 75 % of the total pore volume; pores with
5 diameters greater than 10 μm represent less than 20 % of
6 the total pore volume; and pores with diameters less than
7 0.2 μm represent less than 10 % of the total pore volume.

1 17. The catalyst composition of claim 13, wherein
2 the α -alumina carrier has a water absorption of at least
3 0.35 ml/g and a surface area in the range of from 0.6 m^2 /g
4 to 5 m^2 /g.

1 18. The catalyst of claim 13, wherein the carrier
2 comprises an α -alumina carrier having a composition
3 comprising:

4 (a) from 65 %w to 75 %w, relative to the total
5 weight of α -alumina in the mixture, of a first
6 particulate α -alumina having an average particle size of
7 from 11 μm to 60 μm ;

8 (b) from 25 %w to 35 %w, relative to the total
9 weight of α -alumina in the mixture, of a second
10 particulate α -alumina having an average particle size of
11 from 2 μm to 6 μm ;

12 (c) from 2 %w to 5 %w of an alumina hydrate,
13 calculated as aluminum oxide relative to the total weight
14 of α -alumina in the mixture;

15 (d) from 0.2 %w to 0.8 %w of an amorphous silica
16 compound, calculated as silicium oxide relative to the
17 total weight of α -alumina in the mixture; and

18 (e) from 0.05 to 0.3 %w of an alkali metal compound,
19 calculated as the alkali metal oxide relative to the
20 total weight of α -alumina in the mixture.